

CLAIMS:

1. An impeller suitable for use in a centrifugal pump, the impeller including a shroud having opposed faces, an outer peripheral edge portion and a rotation axis, a plurality of pumping vanes on one of the faces of the shroud and extending away from the rotation axis each pumping vane having an outer peripheral edge portion, and a plurality of auxiliary vanes on the other face of the shroud, the auxiliary vanes of each having an outer edge portion wherein the dimension D_a from the rotation axis to the outer peripheral edge portion of the shroud is greater than the dimension from the rotation axis to outer edge portion of the auxiliary vanes D_b .
2. An impeller according to claim 1 wherein the dimension D_a is greater than the dimension D_c from the rotation axis to the outer peripheral edge portion of the pumping vanes.
3. An impeller according to claim 2 wherein said shroud is a back shroud.
4. An impeller according to claim 3 wherein the impeller further includes a front shroud, the pumping vanes being between the front and back shrouds and the auxiliary vanes being on the other face of one of the shrouds.
5. An impeller according to claim 3 wherein the impeller further includes a front shroud, the pumping vanes being between the front and back shrouds and the auxiliary vanes being on the other face of each of the shrouds.
6. An impeller according to claim 4 wherein the dimension D_a of the front shroud is greater than the dimensions D_b and D_c .
7. An impeller according to claim 4 wherein the dimension D_a of the back shroud is greater than the dimensions D_b and D_c .

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8. An impeller according to claim 4 wherein the dimension D_a of the front and back shrouds is greater than the dimensions D_b and D_c .
9. An impeller according to claim 5 wherein the dimension D_a of the front shroud is greater than the dimensions D_b and D_c .
10. An impeller according to claim 5 wherein the dimension D_a of the back shroud is greater than the dimensions D_b and D_c .
11. An impeller according to claim 5 wherein the dimension D_a of the front and back shrouds is greater than the dimensions D_b and D_c .
12. An impeller according to claim 6 wherein D_b and D_c are substantially the same.
13. An impeller according to claim 12 wherein D_b and D_c are within 5% of each other.
14. An impeller according to claim 13 wherein D_b is less than $0.95 D_a$.
15. An impeller according to claim 14 wherein D_b/D_a is from 0.65 to 0.95.
16. An impeller according to claim 14 wherein D_b/D_a is from 0.65 to 0.9.